

WHAT IS CLAIMED IS:

1. A method for heat treating at least one workpiece comprising the steps of:

cleaning a furnace to be used during said heat treating method;

said cleaning method comprising injecting a gas at a workpiece center location and applying heat; and

diffusion heat treating said at least one workpiece in a gas atmosphere with said gas being injected at said workpiece center location.

2. A method according to claim 1, wherein said cleaning method comprises injecting said gas into said furnace at said workpiece center location at a flow rate sufficient to create a pressure differential which carries contaminants away from said workpiece center location toward an exit.

3. A method according to claim 2, wherein said gas injecting step comprises injecting said gas at a partial pressure of at least 0.8 Torr.

4. A method according to claim 2, wherein said gas injecting step comprises injecting said gas into said furnace at a rate of 30 liters per minute to 70 liters per minute.

5. A method according to claim 2, wherein said gas injecting step comprises injecting an inert gas.

6. A method according to claim 2, wherein said gas injecting step comprises injecting argon.

7. A method according to claim 2, wherein said gas injecting step comprises injecting a reducing gas.
8. A method according to claim 1, wherein said diffusion heat treatment step is carried out at a temperature in the range of 1900 degrees Fahrenheit to 2500 degrees Fahrenheit for a time period in the range of 1 to 24 hours.
9. A method according to claim 1, wherein said diffusion heat treatment step comprises injecting said gas into said workpiece center location at a rate sufficient to carry away contaminants in said workpiece but less than a rate at which a door to said furnace is caused to open.
10. A method according to claim 9, wherein said diffusion heat treatment step comprises injecting said gas into said workpiece center location at a partial pressure of at least 0.8 Torr.
11. A method according to claim 9, wherein said gas is injected into said furnace at a flow rate of 30 liters per minute to 70 liters per minute.
12. A method according to claim 9, wherein said diffusion heat treatment comprises injecting an inert gas.
13. A method according to claim 9, wherein said diffusion treatment comprises injecting argon.
14. A method according to claim 9, wherein said diffusion heat treatment comprises injecting a reducing gas.
15. A method for providing at least one workpiece having a coating comprising the steps of:

diffusion heat treating said at least one workpiece in gas atmosphere within a furnace with said gas being injected at a workpiece center location;

removing said workpiece from said furnace; and

subjecting said coated workpiece to a surface finishing operation.

16. A method according to claim 15, wherein said diffusion heat treatment step is carried out at a temperature in the range of 1900 degrees Fahrenheit to 2500 degrees Fahrenheit for a time period in the range of 1 to 24 hours.

17. A method according to claim 15, wherein said diffusion heat treatment step comprises injecting said gas into said workpiece center location at a rate sufficient to carry away contaminants in said workpiece but less than a rate at which a door to said furnace is caused to open.

18. A method according to claim 17, wherein said diffusion heat treatment step comprises injecting said gas into said workpiece center location at a partial pressure of at least 0.8 Torr.

19. A method according to claim 17, wherein said gas is injected into said furnace at a flow rate of 30 liter per minute to 70 liters per minute.

20. A method according to claim 15, wherein said surface finishing step comprising subjecting said coated workpiece to a peening operation.

21. A method according to claim 15, wherein said diffusion heat treating step comprises injecting an inert gas into said workpiece center location.

22. A method according to claim 15, wherein said diffusion heat treating step comprises injecting argon into said workpiece center location.

23. A method according to claim 15, wherein said diffusion heat treating step comprises injecting a reducing gas into said workpiece center location.

24. A system for heat treating a coated workpiece comprising:

a furnace having a chamber; and

means for injecting a gas into an interior of said furnace chamber at a workpiece center location.

25. A system according to claim 24, wherein said gas injecting means comprises means for injecting said gas at a flow rate sufficient to carry any contaminants from said workpiece center location toward an exit.

26. A system according to claim 24, wherein said injecting means comprises means for injecting at least one of an inert gas or a reducing gas.

27. A system according to claim 24, wherein said injecting means comprises means for injecting argon gas.